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Market shares, R&D agreements, and the EU block exemption

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ABSTRACT

Regulation (EC) No 1217/2010 on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of R&D agreements exempts horizontal R&D agreements from antitrust concerns when the combined market share of participants is low enough. We examine the theoretical basis for this criterion by extending existing models so that a subset of firms innovates and participates in an R&D cooperation agreement. We show that the incentive to increase innovation depends on a complex set of effects. We identify one, the outsider effect, that can lead firms to increase R&D under cooperation precisely when their combined market share is high. In a general model in which all firms innovate, we also find that R&D agreements can be more beneficial at higher market shares. We argue that existing theory therefore does not support limiting the exemption to low market shares.

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"In order to make Europe more competitive what we need to do is to promote Europe's capacity for research and development, for innovation and for entrepreneurship." [1] – Joaquín Almunia

1. Introduction

Horizontal research and development (R&D) agreements, whereby firms in the same industry coordinate their R&D operations and jointly exploit the results, restrict *de facto* inter-firm competition in the discovery of new products or processes. However, horizontal R&D agreements can lead to economic benefits, as they permit participating firms to avoid the duplication of budgets, to combine complementary resources, and to internalize knowledge spillovers, possibly toward more innovative goods and lower production costs.

The European Commission (2010, 2011) recognizes that R&D cooperation can result in net economic benefits. In December 2010, it adopted Regulation (EC) No 1217/2010 on the application of Article 101(3) of the Treaty on the Functioning of the European Union (henceforth the Treaty) to certain categories of R&D agreements, together with corresponding guidelines on the assessment of horizontal cooperation agreements under the European Union competition rules (henceforth, the Guidelines). The new legislation updates and replaces Regulation No 2659/2000 and the precedent version of the Guidelines (European Commission, 2000a, 2000b, 2001). They had been adopted a decade earlier in order to introduce a more economic approach in the assessment of the anti- and pro-competitive effects of inter-firm R&D agreements than the previous formalistic procedures.

Although it introduces several amendments, the new regulation maintains the use of a market share criterion to discriminate firms that will be exempted or not from the burden of assessing the compatibility of their contractual relationships with competition law.[2] If the firms engaged in R&D cooperation have limited market power, in that their combined ex ante market share does not exceed 25%, their agreement is presumed to have no or negligible

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[2] In a discussion of the draft Regulation and Guidelines, published by the European Commission in May 2010, Gutermuth (2010) estimates that "[t]he proposed amendments aim to improve the existing framework of assessment rather than to radically change it" (p. 2). The main changes are: (i) the distinction between R&D activities carried out jointly and the so-called "paid-for research and development" agreements, where a firm finances the R&D operations carried out externally by another independent firm; (ii) the specification that all parties must have full access to the final outcomes of the R&D activities, including intellectual property rights and the know-how, as a condition for exemption from the general prohibition of all concerted practices which restrict competition (under Article 101(1) of the Treaty); (iii) the extension of the list of hardcore restrictions (conditions under which the exemption does not apply) to the case of active sales limitations of the products/technologies resulting from the cooperative R&D; (iv) the clarification of the distinction between an "actual" and a "potential" competitor.

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harmful anti-competitive effects, in line with a general view that innovation increases with product market competition. The Guidelines clearly assert that, in that case, the parties are more likely to transmit efficiency gains to consumers. However, above the 25% threshold the firms are excluded from the exemption. The Guidelines indicate that the parties to the agreement are then less likely to pass on efficiency gains to consumers. The firms must then proceed to the self-assessment of their agreement, as they bear the burden of proving that the restriction in competition implied by the agreement is outweighed by the R&D results and the related benefits to consumers. They also risk the annulment of the agreement together with financial penalties.

A complementary view is due to Galbraith (1952), who observes that R&D activities demand large financial resources, which are not available to small firms in isolation. He sees a direct link between market shares and incentives to invest in the development of new products or processes.[3] This view is also consistent with a legal framework that gives preferential treatment to the formation of R&D agreements by small firms.

However, the recent theoretical and empirical literature has established that the exact connection between the intensity of market competition and R&D investments is not necessarily monotone (see Gilbert, 2006; Schmutzler, 2009; Vives, 2008 for recent authoritative surveys). In particular, surveying oligopoly models of R&D cooperation, De Bondt and Vandekerckhove (2010) find that equilibrium R&D levels and consumer surplus can often be inverted U related with the number of cooperating parties. Overall, relatively few theoretical papers address the link between cooperative R&D and policy (Motchenkova & Rus, 2011).

The objective of this paper is to assess the market share criterion used in the current European legislation in light of the relevant economic theory of R&D agreements. Using the standard industrial organization approach, we investigate whether this criterion facilitates, or penalizes, the formation of those R&D agreements which are most beneficial to consumers. Our main finding is a negative one, that is to say that the incentive for firms to increase their R&D as a result of a cooperation agreement is not linked univocally to market share.

We construct a model that draws from well established contributions (Amir, 2000; Amir, Evstigneev, & Wooders, 2003; d'Aspremont & Jacquemin, 1988; Hinloopen, 2003; Hinloopen & Vandekerckhove, 2009, 2011; Kamien, Muller, & Zang, 1992; Qiu, 1997, among others).[4] Ex ante symmetric firms, in a Cournot oligopoly, compete on a market for substitutable products. To parsimoniously highlight the link between the market share of participants to an R&D agreement and the possible benefits from R&D, we suppose that a subset of firms in the industry may innovate and coordinate their R&D decisions. R&D activity enhances the quality of their products or reduce the marginal costs of production (satisfying the condition of "economic progress"),[5] and firms in the agreement benefit indirectly from the innovative activity of others via R&D input or output spillovers. An important simplification that allows us to derive analytic results is that we assume that outside firms do not conduct R&D, although they benefit at no cost from some fraction of the activity of innovators as may occur in industries in which imitation is important.

In our model, we compare R&D decisions, in the context of a cooperative R&D agreement, with those that would arise if the same firms did not coordinate. Cooperation results in more consumer surplus than competition if and only if innovating firms have an incentive to increase their R&D when they are parties to an agreement. We find no simple link between the ex ante market share of innovators and the benefits to consumers that result from coordinated R&D decisions. R&D cooperation agreements can be detrimental to consumer surplus even if the market share of participants is low, and conversely they can lead to higher consumer surplus even if the market share of participants is high. Moreover, in the particular case of so-called R&D input spillovers, we are able to show that the benefits resulting from R&D cooperation are positively related to market share. We argue that existing theory therefore does not support limiting the exemption to low market shares.

The model we study is a special case of a more general one, in which all firms conduct R&D regardless of whether they participate in an agreement or not. In the general setting, many more strategic effects arise than those that we have characterized analytically, and the presumption is that the link between market shares and the effect of R&D agreements on consumer welfare should then be even more tenuous. We verify this for a numerical example, which we argue casts further doubt on any theoretical grounding for the market share exemption in the regulation.

The remainder of the paper is organized as follows. Section 2 presents the regulation and discusses its implications for firms which have a large market share and contemplate participation in an R&D agreement.[6] Section 3 introduces a model where a group of firms with an arbitrary ex ante market share engages in cooperative R&D. Section 4 describes the incentive for firms to conduct more R&D under cooperation, and identifies an effect, the outsider effect, that can result in cooperation agreements that are desirable only when the ex ante market share of innovating firms is large. Section 5 corroborates this finding with a numerical example in a more general model where all firms perform R&D. Section 6 concludes. Proofs are relegated to Appendix A.

2. Market share threshold and R&D block exemption

Regulation (EC) No 1217/2010 covers all agreements, between two or more firms, that relate to the conditions under which those parties pursue joint research and development of products or technologies, with or without joint exploitation of the results.[7] In the prolegomena, enhanced consumer satisfaction is presented as the motivation for encouraging the agreements that result in more R&D. It is clearly asserted that "[*c*]*onsumers* can generally be expected to benefit from the increased volume and effectiveness of research and development", through "the introduction of new or improved products or services" or "the reduction of prices brought about by new or improved technologies or processes" (paragraph 10, added emphasis). In order to let consumers benefit from the positive outcomes of horizontal R&D cooperation, the regulation sets limits to the application of Article 101(1) of the Treaty on the Functioning of the European Union that prohibits in principle all agreements "which have as their object or effect the prevention, restriction or distortion of competition

[3] "Because development is costly, it follows that it can be carried on only by a firm that has the resources associated with considerable size. Moreover, unless a firm has a substantial share of the market it has no strong incentive to undertake a large expenditure on development" (Galbraith, 1952, p. 92).

[4] Thus, we model firms that do not collude tacitly in the product market. For an analysis of the connection between R&D cooperation and collusion, see Martin (1995, 1997) and Cabral (2000).

[5] The regulation refers to "contract products" and "contract technologies" or "processes" as the outcome of joint research and development activities.

[6] Our discussion focuses on the standpoint of large firms, but there is a complementary concern regarding firms with small market shares if safe harbor is given to some agreements erroneously.

[7] Several categories of R&D agreements are defined in Article 1(1). In addition to R&D activities carried out jointly by several firms, on which we focus in this paper, the new regulation covers paid-for R&D agreements, where a firm finances the R&D activities carried out by another party.

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